Five-Year Review Report

Third Five-Year Review Report

for

Envirochem Corp. Site

Zionsville

Boone County, Indiana

April 2013

PREPARED BY:

United States Environmental Protection Agency
Region 5
Chicago, Illinois

Approved by:

Richard C. Karl, Director
Superfund Division

Date:

3-14-13

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Five-Year Review Report

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Attachments

List of Acronyms

ARARs	Applicable or Relevant and Appropriate Requirements
ASC	Acceptable Stream Concentration
CERCLA	Comprehensive Environmental Response Compensation and Liability Act of 1980
CD	Consent Decree
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
IDEM	Indiana Department of Environmental Management
ICs	Institutional Controls
MCL	Maximum Contaminant Level
NCP	National Oil and Hazardous Substance Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PRGS	Passive Reactive Gate System
PRPs	Potentially Responsible Parties
RA	Remedial Action
RI	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act of 1986
SVE	Soil Vapor Extraction
TBC	To be Considered

TBCW	Thin Barrier Curtain Wall
VOCs	Volatile Organic Compounds
UU/UE	Unlimited Use or Unrestricted Exposure

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Executive Summary

This is the third Five-Year Review (FYR)for the Envirochem Corporation Superfund Site, located in Zionville, Boone County, Indiana. The purpose of this FYR is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory FYR was the signing of the previous FYR on April 4, 2008.

Since the 2008 Five-Year Review, additional remedial work was implemented including the installation of additional soil vapor extraction (SVE) trenches based upon an ESD issued in September 2006. The new SVE trenches were connected to the existing SVE system and intended to capture and treat the more mobile contaminants in the vicinity of the SVE trenches and water in sand seams and till that enters the SVE trenches. The trench system along with a partial thin barrier curtain wall (TBCW) and a passive reactive gate system (PRGS) were tested and failed to perform as designed (i.e., have not met cleanup standards). Furthermore, some of the data indicate that contaminants in the till are migrating downward and away from the source areas beyond the property boundary.

The remedy is expected to be protective of human health and the environment upon completion of an effective remedial action and in the short term, exposure pathways that could result in unacceptable risks are being controlled. Institutional controls (ICs) are in place and effective. In order for the remedy to be protective in the long-term, additional remedial action is necessary. The Trustees who represent the PRPs for the site are planning additional investigation and evaluations to identify and design additional remedial action alternatives. These additional remedial measures may require another ESD or a ROD Amendment, depending on the nature of the additional measures.

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Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Envirochem Corp.		
EPA ID: IND084259951		
Region: 5	**State:** IN	**City/County:** Zionsville/Boone

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Matthew J. Ohl
Author affiliation: U.S. EPA
Review period: 04/04/2012 . - 04/04/2013
Date of site inspection: January 18, 2013
Type of review: Statutory
Review number: 3
Triggering action date: 04/04/2008
Due date *(five years after triggering action date)*: 04/04/2013

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU 1

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): 01	**Issue Category: Remedy Performance**			
	Issue: Remedy failure			
	Recommendation: Complete additional investigation and evaluations; select additional remedial measures. These additional remedial measures may require another ESD or ROD Amendment. Complete construction, and operate and monitor remedy. Review ICs once final remedy elements are established.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP; EPA	EPA/State	04/04/2015

Protectiveness Statement(s)

Operable Unit:	*Protectiveness Determination:*
01	Will be Protective

Protectiveness Statement:

The remedy is expected to be protective of human health and the environment upon completion of an effective remedial action and in the short term, exposure pathways that could result in unacceptable risks are being controlled. Institutional controls (ICs) are in place and effective. In order for the remedy to be protective in the long-term, additional remedial action is necessary. The Trustees who represent the PRPs for the site are planning additional investigation and evaluations to identify and design additional remedial action alternatives. These additional remedial measures may require another ESD or a ROD Amendment.

Sitewide Protectiveness Statement

Protectiveness Determination:
Will be Protective

Protectiveness Statement:

The remedy is expected to be protective of human health and the environment upon completion of an effective remedial action and in the short term, exposure pathways that could result in unacceptable risks are being controlled. Institutional controls (ICs) are in place and effective. In order for the remedy to be protective in the long-term, additional remedial action is necessary. The Trustees who represent the PRPs for the site are planning additional investigation and evaluations to identify and design additional remedial action alternatives. These additional remedial measures may require another ESD or a ROD Amendment.

Five-Year Review Report

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review process, if any, and identify recommendations to address them.

The United States Environmental Protection Agency (EPA or "the Agency") is preparing this five-year review pursuant to Section 121 of the Comprehensive Environmental Response Compensation and Liability Act of 1980 ("CERCLA"), as amended, and Section 300.430(f)(4)(ii) of the National Oil and Hazardous Substance Contingency Plan ("NCP"). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section 104 or 106, the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP. 40 Code of Federal Regulations ("CFR") §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA, Region 5, conducted the five-year review of the remedy implemented at the Envirochem Superfund Site ("Site") in Zionsville, Boone County, Indiana. This report documents the results of this review conducted by Matthew J. Ohl, Remedial Project Manager ("RPM") for the site. The Indiana Department of Environmental Management ("IDEM") also reviewed and provided comments on the report. IDEM's comments were fully incorporated in the report. The review was initiated in April 2012 and completed in April 2013.

This is the third five-year review for the Site. The triggering action for this statutory review is the completion of the previous five-year review on April 4, 2008 as shown in EPA's CERCLIS database. The five-year review is required because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Initial discovery of problem or contamination	April 1, 1979
NPL listing	September 8, 1983
Removal actions	1983-1985
Remedial Investigation/Feasibility Study complete	September 25, 1987
ROD signature	September 25, 1987
ROD Amendments or ESDs	June 7, 1991; June 1997; September 2006
Enforcement documents (CD, AOC, Unilateral Administrative Order)	November 9, 1983; September 10, 1991; February 2, 2006
Actual remedial action start	November 25, 1998
Construction start date	December 1997
Deletion from NPL	Site has not been deleted
Previous five-year reviews	April 8, 2003 and April 4, 2008

III. Background

Physical Characteristics

The Site (also known as the "Environmental Conservation and Chemical Corporation," or the "ECC" Site) is located east and south of the Boone County Resource Recovery Systems, Inc. facility on U.S. Highway 421 in a primarily rural area of Boone County, Indiana, approximately 5 miles north of Zionsville and ten miles northwest of Indianapolis. The Site, which occupies approximately 6.5 acres of land, was placed on the National Priorities List ("NPL") for site cleanup in September 1983. The Northside Sanitary Landfill Superfund Site is located immediately to the east of the Site and the Third Site is located immediately to the south of the Site. A non-time critical removal action is ongoing at Third Site. The last five-year review for the Northside Sanitary Landfill Superfund Site, conducted in August 2009, is available online at http://www.epa.gov/Region5/cleanup/northside/.

An unnamed ditch, near the east side of the site, flows into Finley Creek which flows into Eagle Creek about a half-mile downstream of the site. Eagle Creek, in turn, feeds into the Eagle Creek Reservoir about ten miles further downstream. The Eagle Creek Reservoir has a storage capacity of 7.8 billion gallons and is one of several sources of drinking water for Indianapolis. More information on water quality is provided by Citizen's Energy Group online at http://www.citizensenergygroup.com/pdf/2011WaterReport-IndyMorgan.pdf.

Land and Resource Use

The current land use for the surrounding area is residential, commercial, and agricultural. Nearby residents that are not connected to the municipal water supply use private wells for their water supply. A Health Consultation prepared by the Indiana State Department of Health for the adjacent Third Site concluded that private wells in the area are not impacted and deeper groundwater should be protected by a confining layer. The Health Consultation is available online at http://www.atsdr.cdc.gov/hac/pha/pha.asp?docid=890&pg=0. Recent data indicate the potential migration of dissolved-phase contaminants, including vinyl chloride, into the sand and gravel aquifer underlying the till unit and away from source areas at the Envirochem Site to Third Site. Further investigation, monitoring and treatment, including plume containment are expected to be necessary.

History of Contamination

Envirochem began operations in 1977 and was engaged in the recovery, reclamation, and brokering of primary solvents, oils and other wastes received from industrial clients. Waste products were received in drums and bulk tankers and prepared for subsequent reclamation or disposal. The accumulation of contaminated stormwater on-site, poor management of the drum inventory, and several spills caused State and EPA investigations of Envirochem. The State pursued Envirochem for violations of the Environmental Management Act, the Air Pollution Control Law, and the Stream Pollution Control Law, resulting in a July 1981 Consent Decree, approved by the Boone County Circuit Court ("Court"). That Court imposed a civil penalty against Envirochem and placed Envirochem into receivership. In May 1982, Envirochem was ordered by the Court to close and environmentally secure the Site for failure to reduce hazardous waste inventories. By August 1982, Envirochem was found to be insolvent.

Initial Response

EPA proposed the Site for the NPL in December 1982 and the Site was placed on the list in September 1983. EPA's contractor, CH2M Hill, performed a Remedial Investigation ("RI") in 1983 and 1984 which involved an investigation of the nature and extent of contamination in soil, groundwater, surface water and sediments on and around the Site. The RI Report, dated March 14, 1986, documented the results of the investigation as well as historical investigations performed by other parties. The historical investigations were conducted from 1976 through 1982.

Soil contaminants found onsite were primarily volatile organic compounds ("VOCs") and phthalates. Migration of VOCs in the soil to the shallow saturated silty clay zone has occurred on-site. The shallow sand and gravel deposit (approximately 18 feet below ground surface) has also been found to be contaminated with VOCs, although it is not clear whether the source may have been the former cooling pond onsite rather than downward migration from the shallow saturated zone. Organic contaminants were also found in Finley Creek, immediately downstream of the site. Under Site conditions at the time of the RI, the VOCs and certain

phthalates were expected to leach from subsurface soil into the groundwater and slowly migrate to the unnamed ditch or Finley Creek, which are hydraulically downgradient of the Site. Once in the surface waters, contaminants would either volatilize, adsorb to sediments, or experience dilutions on the order of 20 to 1 before reaching the downstream Eagle Creek Reservoir (about 10 miles).

The endangerment assessment found that under the no action alternative, potential risk to human health and the environment exists at the Site (excess lifetime cancer risk levels as high as 4×10^{-1} were estimated). For public health concerns, the exposure routes that resulted in an excess lifetime risk greater than 1×10^{-6} were:

- Soil via ingestion. Excess lifetime cancer risk of 4×10^{-3} to 8×10^{-6}. This route requires soil below existing cap to be uncovered for exposure to occur.
- Groundwater in the shallow saturated zone and shallow sand and gravel deposit via ingestion or dermal absorption. Excess lifetime cancer risk of 4×10^{-1} to 3×10^{-3}. This route requires installation of a potable water well in area of contamination.
- Ingestion of fish with bio-concentrated contaminants. Excess lifetime cancer risk of 3×10^{-6}. This route requires regular fishing in the unnamed ditch or Finley Creek downstream to confluence with Eagle Creek.

Risk from dermal absorption of VOCs, during wading in the unnamed ditch or Finley Creek downstream to Eagle Creek, was calculated to be between 1×10^{-6} and 1×10^{-7}.

For environmental concerns, the RI determined that the projected release of contaminants to the surface water in the Unnamed Ditch should not exceed the ambient water quality criteria for protection of aquatic life. A fish consumption advisory remains in place for certain fish caught in Eagle Creek due to elevated levels of polychlorinated biphenyls ("PCBs"), but this has not been attributed to the site.

The major public health and environmental risks from the Site, which were derived in the endangerment assessment, are outlined in Table 6-16 of the RI Report. The major risks come from the contaminated soil via direct contact and release of soil contaminants to the groundwater and subsequent use of groundwater for bathing and a drinking water source. The population at risk was determined to be limited, and while the area was projected to grow, the impact of the Site appeared to be localized. In conclusion, the RI determined that the Site posed a potential threat to the public health, welfare, and environment, and recommended that a feasibility study be performed.

EPA's contractor (CH2M Hill) performed a Feasibility Study ("FS") and produced a FS report, dated December 5, 1986, which evaluated several alternatives for cleaning-up the Site to be combined with the remedial action for the neighboring Northside Landfill Site, which had also been placed on the NPL.

Surface contaminants were removed from the Site in an operation extending from March 1983 through 1984. These cleanup efforts were initiated by EPA and completed by a group of PRPs. The cleanup was overseen by EPA and IDEM, pursuant to a Consent Decree entered on November 9, 1983. Actions included removal and treatment or disposal of cooling pond waters, approximately 30,000 drums of waste, 220,000 gallons of hazardous waste from tanks, 5,650 cubic yards of contaminated soil and cooling pond sludge.

In March 1985, ponded water containing hazardous substances was discovered on the concrete pad at the southern end of the Site. During the resulting emergency action, EPA constructed a sump at the southeast corner of the Site, and removed and disposed of 20,000 gallons of contaminated water containing high levels of volatile organics.

Basis for Taking Action

Soils at the site are contaminated with high levels of numerous volatile and semi-volatile organic compounds, which present potential, unacceptable human health risks through exposures to soil and groundwater. The health risks are due to levels of hazardous substances exceeding EPA's risk management criteria for either the average or reasonable maximum exposure scenarios. Unacceptable risks from exposure to groundwater are attributed to the presence of various organic and inorganic hazardous substances that exist at concentrations exceeding State and Federal drinking water standards and surface water quality standards.

IV. Remedial Actions

Remedy Selection

A Record of Decision ("ROD") was issued by EPA on September 25, 1987, selecting a combined remedy for the Site and the adjacent Northside Sanitary Landfill Site. That ROD provided for a low-permeability cover system over the contaminated areas and a groundwater extraction and treatment system.

Based on a treatability study performed by the PRPs, EPA and IDEM, it was later determined that it would be feasible and preferable to actively treat the contaminant source at the Site, rather than simply containing these materials as provided for in the 1987 ROD. Therefore, EPA issued Amended RODs in June 1991, establishing separate, complementary remedial approaches for the Envirochem and Northside Sites.

The 1987 ROD remedial action objectives include the following: preventing direct contact, inhalation, and ingestion of contaminated soils, landfill contents, groundwater, leachate, and sediment; reducing infiltration; enhancing the soil vapor extraction system; controlling migration of contaminants to groundwater, surface water and sediments; removing and destroying volatile organic compounds and selected base neutral/acid organics from the soils.

As amended, the ROD for the Site required:

- Access Restrictions: Placement of deed restrictions on the property to prevent future development of the land and prohibitions on the installation of wells; thereby protecting against direct contact with contaminated soil and groundwater.

- Soil vapor extraction ("SVE"): Construction of a system utilizing injection and extraction trenches to vaporize and extract volatile organic compounds and phenols from contaminated soils. These contaminants would be captured and removed utilizing granular activated carbon. The goal of the SVE system was to clean the soil contamination source areas to levels that would assure long-term protection of groundwater and surface water.

- Resource Conservation and Recovery Act ("RCRA") Compliant Cap and Surface Controls: Construction of a multi-layered cap over the entire Site. The cap would comply with RCRA performance-based standards. (The presence of the cap would also improve the efficiency of the soil vapor extraction system by reducing the amount of air and vapor that could escape from that system.) The 1987 ROD also included the removal of contaminated sediments, which is then presumed to be put under this cap. Surface controls included rerouting of the unnamed ditch west of the Site to keep surface waters further away from contaminated soil areas, and demolition and disposal of on-site buildings.

- Contingent Groundwater Treatment: Groundwater collection and treatment would be required if SVE did not achieve soil cleanup standards within a five-year operation period, or if at that time surface water or groundwater samples still showed unacceptable levels of contamination. Collected groundwater would be treated to meet effluent standards before discharge into Finley Creek. Groundwater collection and treatment would continue until cleanup standards were met.

- Monitoring of leachate, groundwater, surface water, and sediments.

The objectives of the cap are to prevent direct contact with contaminated soils, reduce infiltration, and enhance the soil vapor extraction system. The objective of the soil vapor extraction activity is to remove and destroy VOCs and selected base neutral/acid organics from the soils.

Remedy Implementation

EPA and IDEM have jointly overseen cleanup activities at the Site under authority of CERCLA. EPA and IDEM entered into a Consent Decree with certain PRPs who agreed to perform the final remedy for the Site. That Consent Decree was approved by the U.S. District Court for the Southern District of Indiana on September 10, 1991. The Consent Decree requires those PRPs to

implement the remedy selected by EPA (with IDEM's concurrence) in a September 25, 1987 ROD and a June 7, 1991 ROD Amendment.

Since that time, the PRPs have, under EPA and IDEM supervision: (1) conducted a Supplemental Investigation in January 1993, to collect groundwater data needed to design dewatering and treatment facilities associated with the SVE system; (2) obtained the necessary access agreements in July 1993, with the site owners, to permit cleanup of contaminated areas and support activities on adjacent property; (3) completed site preparation work in the Fall of 1993 (with final supplemental work in the Spring of 1994), including an upgrade of site fencing, removal of site structures and debris, decontamination and disposal of tanks, construction of pads for future decontamination and storage activities, site grading and construction of drainage channels; (4) from September 1994, through January 22, 1996, secured, inventoried, analyzed and removed drums of contaminated material that had accumulated on-site during previous investigations and response activities; (5) submitted a 90% design for completion of the remedial action on December 19, 1991, with all parties recognizing (in light of circumstances described below) the need for substantial revisions, (6) submitted a new 30% design plan for review and comment in July 1994, (7) submitted a revised 30% design plan in January 1995, (8) submitted a 90% design plan on October 27, 1995; and submitted a draft 100% design on September 26, 1996.

While the PRPs began designing and implementing the final remedy for the Site under EPA and IDEM oversight, newly developed information persuaded EPA and IDEM that certain technical modifications and improvements to the selected remedy were appropriate. Section 117(c) of CERCLA and Section 300.435(c)(2)(I) of the NCP establish procedures for explaining, documenting, and informing the public of significant changes to the remedy that occur after the ROD is signed. An Explanation of Significant Differences ("ESD") was required since the remedial action to be taken differed significantly from the remedy selected in the ROD but did not fundamentally alter that remedy with respect to scope, performance or cost. The ESD addressed several issues. The Consent Decree and accompanying documents were modified to reflect the remedy changes described in the ESD.

First, during the January 1993 Supplemental Investigation, the PRPs identified nine organic compounds in site groundwater that had not been identified at levels of concern in the Remedial Investigation (and thus did not have cleanup standards in the ROD). The parties discussed and agreed to a mechanism for establishing appropriate cleanup standards for certain of these additional compounds.

Second, the Supplemental Investigation also showed that the water table at the southern end of the site was higher than it was during the SVE pilot test conducted in 1987, and was high enough that it could be expected to hamper the effectiveness of SVE in that area. In response to this data, the PRPs evaluated other options for addressing contamination in the southern end of the site and presented this evaluation to EPA and IDEM.

In order to remediate soils in the southern portion of the Site, soils beneath the concrete pad were generally excavated to a depth of 9 feet. This is the depth to which SVE was originally expected to be effective. Sheet pilings were used in the eastern portion of this area to reduce the amount of water that would otherwise seep into the excavated area. When the 9 foot depth was reached, any remaining visible contamination was also excavated where possible, and any contamination of concern identified through field screening was also excavated. Excavation was limited by concerns about sidewall stability and the need to avoid an underlying zone of highly permeable sand. Most of the water accumulated in the excavation area was collected, characterized, treated to meet discharge standards and appropriately disposed of through discharge to an on-site surface water body. Confirmatory soil samples were collected and the excavation was backfilled with clean soil from an off-site borrow source. The concrete pad overlying this area was crushed and excavated with the underlying soil. The excavated soils and crushed concrete was moved to the northern area of the Site where SVE was performed on the soil and crushed concrete. An impermeable cap, which complies with RCRA Subtitle C standards, was to be placed over the excavated area unless the confirmatory sampling shows that the excavation produced the equivalent of a clean closure (i.e., no detectable contamination) under RCRA. This cap was not constructed while the PRPs pursued clarification from IDEM on RCRA closure requirements for the area.

Third, during excavation activities conducted as part of the site preparation work (both in preparing the drainage channels and in preparing the decontamination pad), contamination was encountered to the west of the approximate western site boundary identified in the ROD and the Consent Decree. This required the PRPs to conduct additional sampling along a portion of the western boundary of the site to better determine the nature and extent of contamination in that area. The PRPs had planned to use this area as part of the "Central Support Zone" for storage and movement of equipment and materials for the remedy. The PRPs conducted their Central Support Zone Investigation in July 1995.

Fourth, when researching SVE technologies in preparing the design, the PRPs learned that: (1) SVE technology developments made it possible that extraction wells might prove to be as effective, or more effective, than the extraction trenches specified in the Amended ROD; (2) on-site activities to operate and maintain the SVE system would likely damage the integrity of the RCRA cap, requiring potentially difficult repairs and suggesting that use of an interim cap could still improve the effectiveness of SVE and be upgraded to a full RCRA cap after SVE was complete; (3) SVE contractors possess specialized and sometimes proprietary information on extraction processes that are necessary to complete a design, but would not be available until after this contractor is selected based on the initial design, an approach that was somewhat inconsistent with the procedures described in the 1991 Consent Decree.

As noted above, soils and crushed concrete from the southern area of the Site were excavated and moved to the northern portion of the Site. After this material was placed and graded properly, a surface cover was placed over this area. This cover consisted of a minimum of 3 feet of compacted native soil, with low permeability, and 1 foot of top soil to support vegetation. This cover also facilitated the proper operation of the SVE system. The final cover, consisting of

a geo-composite drainage net with a minimum transmissivity of 0.01 ft^2/sec., a minimum of 1 foot of rooting soil and 1 foot of topsoil, was placed on top of the originally placed soil layer described above. Therefore, the final cover is essentially identical to the cover described in the Amended ROD with one major exception. This final cover was not extended over the excavated area on the southern end of the Site as the PRPs pursued clarification from IDEM on RCRA closure requirements for the area.

Fifth, Central Support Zone Investigation data indicated that the organic carbon content of site soils was generally higher than was assumed in the model used to set soil cleanup levels in the ROD Amendment. The ROD model calculated the rate at which contamination in the soil would be transferred to groundwater as groundwater flowed through the Site. Using the ROD model, EPA calculated cleanup standards that would reduce soil contamination to levels that would be protective of groundwater. The site-specific data on the organic carbon content of site soils indicated that a slightly higher level of contamination in the soil would likely remain adsorbed to the soil rather than leaching to groundwater as originally predicted. As a result of this new information, EPA and IDEM agreed to make minor revisions to the model and the cleanup standards to reflect the actual site conditions. Since cleanup standards were going to be revised, EPA and IDEM also agreed to add a minor change in the cleanup standard for 1,1-dichloroethane ("DCA"). The change in the DCA cleanup standard was based on information about the cancer potency of DCA developed since the time of the 1991 ROD Amendment. Since that time, a general scientific consensus has developed that concludes DCA does not pose the level of cancer risk previously believed. For more information see the Agency for Toxic Substances and Disease Registry's toxicological profile for DCA available online at http://www.atsdr.cdc.gov/toxprofiles/tp133.html As a result, the risk calculation and cleanup standard for DCA were re-calculated to reflect this information.

Institutional Controls

Institutional Controls (ICs) are non-engineered instruments, such as administrative and/or legal controls that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for those areas that do not allow for unlimited use or unrestricted exposure (UU/UE).

The Remedy embodied in the ROD and Consent Decree, as amended, requires containment of waste on site and places operation and maintenance obligations on the PRPs for the foreseeable future. As long as those obligations exist, the site cannot be disturbed or developed. The PRPs are obliged to maintain the cap and the remedy elements under the Consent Decree, as amended, through an O&M plan. This is important because wastes and contaminated soils remain beneath the cap that would pose a potential threat to human health or the environment if the integrity of the cap was compromised.

As required by the Consent Decree, the Trustees entered an access agreement with the Bankert family, who own the site property through a trust and live adjacent to and southwest of the site. In addition to providing unrestricted access for site work, the Bankerts also agree "that they will

not construct or place any improvements within the Remedial Action Boundary or Support Zone Area Boundary ... unless and until the Court enters an order in USA v. Enviro-Chem determining that [the PRPs] have no further obligations...." These areas include all of the relevant portions of the site and will be identified in maps to be developed as part of the IC evaluation activities or IC Plan. The agreement was recorded with the Boone County Recorder's office in 1993.

The objective of the access agreement is to ensure access by EPA and IDEM, and prevent any use of the site property and any disturbance of the cap or the remedy elements. The agreement imposing these restrictions is recorded and states that the covenants run with the land.

Table 2: Institutional Controls

Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions.	IC Objective	Title of Institutional Control Instrument Implemented
Containment area on Envirochem Property - Cap and Other Remedy Components	Prohibit interference with remedy components; Prohibit residential use of property	Restrictive covenant in access agreement that states it runs with the land recorded at Boone County Recorder's Office in 1993
Groundwater impacted by contamination at or from the Envirochem property which exceeds cleanup standards	Prohibit installation of wells; Prohibit use of groundwater	Restrictive covenant in access agreement that states it runs with the land recorded at Boone County Recorder's Office in 1993

System Operations and O&M Costs

The Trustees have contracted with Environ and others to perform site operation and maintenance (O&M) activities. The SVE system was operated from 1998 until early 2001. Under the ROD, as amended and modified, the PRPs had five years to demonstrate that the SVE system had achieved the remedial cleanup objectives. If the PRPs could not demonstrate that the cleanup standards had been achieved, the Consent Decree required them to implement a contingent remedy to assure containment of site-related contamination. That contingent "Additional Work" provision required the PRPs to construct and operate a groundwater collection trench along the south and east boundaries of the site to assure protection of off-site groundwater and surface water.

In the 2008 Five-Year Review, EPA confirmed that the SVE remedy could not meet cleanup standards, so that the contingent containment remedy was required to assure long-term protectiveness. The PRPs added active SVE extraction, PRGS and TBCW components, which were intended to improve the effectiveness of the collection system in the contingent remedy, as discussed in the ESD issued in September 2006 and the Consent Decree modification entered on February 2, 2006. Completion of TBCW, PRGS and enhanced SVE construction was documented in the 2009 Preliminary Close-out Report. The enhanced SVE system was operated sporadically from 2008 until 2012. In spite of various modifications, the system has failed to meet cleanup standards.

System operations have not been continuous since it was determined that it wouldn't meet cleanup standards as designed. O&M costs will be evaluated in the next five-year review if there is adequate data at that time. The September 2006 ESD estimated the cost of constructing the Exhibit Z-1 remedy in the range of $2 million, and the total cost of operation, maintenance and monitoring was expected to be in the range of $500,000. O&M costs provided by the Trustees since the last five-year review are included in Table 3.

Table 3: Annual O & M and Construction Costs from January 1, 2008 through October 31, 2012

2008	$1,950,770.97
2009	$473,690.12
2010	$328,243.94
2011	$138,778.44
2012 (through October)	$233,635.28
TOTAL	$3,125,118.75

Surface Water and Groundwater Monitoring Systems

The monitoring system consists of surface water monitoring points, groundwater monitoring wells and piezometers. Installation of groundwater monitoring wells and piezometers has been documented in various reports, including Surface and Subsurface Water Sampling reports, the RI/FS reports, etc. The documentation includes boring logs and well construction details.

The monitoring systems were inspected and found to require additional investigation to comply with the intent of the remedial action. The long-term remedial action requirements at the Site for O&M include, but are not limited to routine maintenance of any groundwater monitoring systems, fencing and warning signs; and periodic sampling and testing of groundwater monitoring wells, piezometers and surface water.

V. Progress Since the Last Review

The protectiveness statement from the last five-year review stated, "The remedy is expected to be protective of human health and the environment upon completion and in the short term, exposure pathways that could result in unacceptable risks are being controlled. In order for the remedy to be protective in the long-term, additional remedial action contemplated in the Consent Decree and described in the 2006 ESD is necessary to ensure protectiveness. Protectiveness requires compliance with effective institutional Controls (ICs). Long-term stewardship must be assured which includes implementing, maintaining and monitoring effective ICs." That may include updating the current ICs when the final remedy elements are established.

As documented in the September 2009 Preliminary Close-out Report, construction of the TBCW, SVE system, PRGS and other remaining components of the revised contingent remedy was

completed. Operation of the system began in December 2008; however, significant concerns were raised indicating that the SVE system was not functioning as designed due to weather conditions. The system was shut down until the problems could be evaluated under more favorable weather conditions beginning on March 12, 2009. Construction problems were identified, repairs were made, and additional construction activities were completed. A bench scale study was performed to evaluate PRGS system treatment performance. On the basis of the findings of the bench scale study the PRPs chose not to further pursue the PRGS treatment system as an element of the remedy. After several years of sporadic operation, evaluation and modifications, the system has failed to meet cleanup standards and operation of the SVE system has been discontinued. Because elements of the 2006 ESD have not performed as expected, additional measures will be developed and put in place based on a supplemental investigation and evaluation conducted by the PRPs. These additional remedial measures may require another ESD or a ROD Amendment, depending on the nature of the additional measures. The Trustees who represent the PRPs are conducting a supplemental investigation and evaluation to develop "additional work" elements that will assure containment of groundwater contamination.

EPA reviewed the ICs and determined that they were effective and a formal IC plan was not necessary.

Table 4: Actions Taken Since the Last Five-Year Review

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Remedy Failure	Further remedial action is necessary	PRP	04/30/2009	Enhanced SVE system was constructed and operated; however it failed to meet cleanup standards in spite of operational and construction changes Supplemental investigation and evaluation will identify supplemental measures to assure that remedial objectives are achieved.	9/03/2009
Further IC Evaluation is needed to assure the ICs continue to function as intended	Conduct additional IC evaluation activities.	PRP	10/30/2008	The ICs were evaluated and determined to be effective as written.	12/31/2009

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Long-term stewardship must be assured which includes maintaining, monitoring, and enforcing effective ICs	Based upon the IC evaluation activities, an IC Plan will be prepared for required follow-up actions to assure that the remedy remains protective including planning for implementation of ICs and long-term stewardship.	EPA	10/30/2009	The ICs have been maintained and monitored and they have been effective. EPA has determined that an IC plan is unnecessary at this time. ICs may be reviewed for possible updates once all final remedy elements are established.	12/31/2009

VI. Five-Year Review Process

Administrative Components of the Five-Year Review Process

In early 2012 EPA informally notified the IDEM and the Trustees representing the PRPs for the site of the five-year review. Additional notification included a formal written notification on April 27 and December 7, 2012, respectively.

Community Notification and Involvement

The community notification included a newspaper ad in the *Indianapolis Star* on August 30, 2012. The ad states that there was a Five-Year Review and invited the public to submit comments to EPA. It also stated that the FYR would be made available at the Site Information Repository located at the Hussey-Mayfield Memorial Public Library, 250 N. Fifth Street, Zionsville, IN 46077-0840.

Document Review

Relevant portions of previous documents were reviewed including monitoring data, the ROD, ROD amendment, ESDs, consent decrees, and previous five-year reviews.

Data Review

The following reports contain the data collected and reviewed since the 2008 FYR:

- Augmented SVE Trench Completion Report for Attachment Z-1 Remedy, Enviro-Chem Superfund Site (HIS Constructors, LLC, April 2009)
- Final Report, December 2009 Semi-Annual Surface and Subsurface Water Monitoring Report, Enviro-Chem Superfund Site, Zionsville, Indiana (August Mack, Feb 2010)
- Monthly Discharge Report, June 2011, Enviro-Chem Zionsville, Indiana, (IWM consulting Group, July 26, 2011)

- Monthly Discharge Report, August, 2011 2011, Enviro-Chem Zionsville, Indiana, (IWM consulting Group, July 26, 2011)
- Monthly Progress Report- July 2011, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ September, 2011)
- ASVE Trench System Sampling, ECC Site, November 4, 2011, (Environ, January, 2011)
- December 2010 Surface and Subsurface Water Sampling Event, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, March 2011)
- Monthly Discharge Report, April, 2012, Enviro-Chem Zionsville, Indiana, (IWM consulting Group, April 26, 2012)
- Flow Evaluation Work Plan, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, Jun 2012)
- June 2012 Surface and Subsurface Water Sampling Event, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, August 2012)
- Flow Evaluation Work Plan, Revision 1, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, Oct 2012)
- Bench-Scale Treatability Report in Support of a ZVI Application in a Reactive Vessel for Treatment of cVOCs at a Site in Zionsville, IN (FMC Adventus, April 2012)
- May 20, 2011 TECHNICAL MEMORANDUM, Proposed PRGS Enhancements
- ECC Site Trench Water Dissolved Oxygen Measurements (Environ September 26, 2012)
- ECC Site Water Treatment System Capacity Evaluation (Environ September 27, 2012)
- Analytical Results for Subsurface Water Samples - December 2012 (Table by Environ, February 13, 2013)
- December 2012 Surface and Subsurface Water Sampling Event, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, March 2013)

The data indicate that the TBCW and trench system may not be containing the potential future migration of site-related contaminants. Hydraulic gradients, measured in each piezometer and piezometer nest, indicate the potential migration of on-site contaminants around the ends or beneath portions of the TBCW. Moreover, groundwater chemistry data, representing the shallow sand and gravel unit, suggests that dissolved-phase contaminants have migrated downgradient outside the trench area. Downgradient monitoring well data exceeding site clean-up levels suggesting downgradient migration includes ECC well S-5 in the shallow sand and gravel unit at 13 ug/l VC, and Third Site well MW-26 at 140 ug/l VC. MW-26 is screened in the shallow sand and gravel unit immediately downgradient of the ECC site and well upgradient of Third Site SVE AREAs. As a result, groundwater discharge to the unnamed ditch and the migration of contaminants away from source areas (both horizontally and vertically) remain potential concerns to be addressed by the additional remedial action. Contamination that remains in the soil and groundwater could potentially pose vapor intrusion risks via the indoor air pathway and may result in a longer period of time to achieve groundwater cleanup standards. Additional evaluation will be necessary to confirm the determination of the protectiveness of this pathway.

Recent data indicate the potential future migration of onsite contaminants to the deep aquifer because the previously identified upward vertical hydraulic gradient does not appear to be

present across the site and the ability of the underlying soils to act as a confining layer is questionable.

Dense non-aqueous phase liquid ("DNAPL") was historically only identified at the Site in till well T-2, however, given the passage of time further investigation is appropriate. When present in significant quantity, DNAPL may act as a continuing source of groundwater contamination. Therefore, DNAPL is considered to be a principal threat waste.

EPA expects the Trustees to conduct additional investigation and monitoring of surface water, fine-grained sediments, and groundwater; and evaluate the potential for vapor intrusion issues by 2014. Data collected during or after construction of the additional remedial action will be reviewed in the next five-year review.

Interviews

The community involvement plan was updated in December 2007 by EPA. EPA conducted interviews in support of the community involvement plan. Additional interviews, solely for the purpose of the five-year review, were not deemed necessary.

Site Inspection

The Site inspection was conducted on January 18, 2013. In attendance were Matthew Ohl, EPA; Steve Ryan and Brian Hahn, EPA's contractor Weston Solutions; Doug Petroff, IDEM; and Ronald Hutchens, Environ, contractor for the Trustees that represent the PRPs. The inspection included the monitoring wells, vegetative cover, drainage ditches, access roads, security fence, above-ground utilities, treatment building, tanks and ancillary piping. In addition to the remedy failure to be addressed by the current remedial action activities, EPA noted site maintenance issues including fencing issues (woody vegetation growing through fence, holes, soil piled against fence, soil eroded away leaving holes under fence), a lack of perimeter warning signs, sediment and vegetative growth accumulation in many of the drainage ditches, channeling and erosion in the last section of the drainage ditch leading to Unnamed Ditch. A culvert in the north perimeter drainage ditch was half full of weeds and sediment. A culvert along the east side of the site extends from the adjacent property under a road then under the Site fence and discharges as run-on into the east drainage ditch. Stormwater that comes from the working face of the adjacent property recycling operation would discharge into the Site stormwater drainage system.

Cat tail rushes were growing in the decontamination pad which was full of standing water. Frequency of mowing the vegetation on the cover was unknown. No signs of standing water, subsidence, or erosion were noted on the cap. A sealed 55-gallon drum that had no label was stored on the decontamination pad. Contents of the drum were unknown to the PRP representative.

Several operation and maintenance issues were noted with the treatment system which is used intermittently to treat groundwater contaminated with VOCs from both ECC and Third Site.

However, the building and groundwater treatment system equipment appeared to be in good working order. Currently, the SVE system is shut down. The groundwater treatment system operation and maintenance issues noted include the following. Pre-treatment, post-treatment and other groundwater treatment sample tap locations for systems operation and NPDES discharge permit were not labeled appropriately. Influent and effluent pipes from and to Third Site and the ECC SVE Trenches were not adequately labeled with Site name or flow direction. No treatment system log of operations is maintained on site. No treatment system O&M manual was available on site. According to PRPs representative biofouling was not an issue with the air stripper. Frequency of GAC change-out was unknown.

The floating cover on the contaminated water tank, T-2, was replaced in 2012. During the replacement the under-drain air diffuser in the bottom of T-2 was removed because it was degraded but was not replaced with a new diffuser. After the floating HDPE cover was replaced tank T-2 was placed back in service.

VII. Technical Assessment

Question A: Is the Remedy functioning as intended by the Decision Document

No. Since the last five-year review was completed, the SVE treatment system required by the 2006 ESD has failed to meet cleanup standards. The low permeability cover appears to be in good condition; however, it can't prevent the release of hazardous substances in contact with the groundwater. Other components, including the TBCW and the trench system, were only designed to collect the necessary amount of water from the upper till unit to enable potential successful SVE treatment. The design of the PGRS, TBCW and trench system may not be adequate to treat and contain the groundwater given the failure of the SVE system to meet clean-up standards. Changes in operating procedures are not expected to achieve and maintain performance standards; however, additional remedial action is being planned. Given the current SVE treatment system has failed to meet cleanup standards and additional remedial action is being planned, O&M costs and optimization opportunities to improve the performance and/or reduce costs will be evaluated in the next five-year review. The failure of the remedial action could place protectiveness at risk in the future. Access controls are in place to prevent exposure (*e.g.*, fencing). ICs are also in place to prevent exposure and interference with the remedial action. Based on inspections, monitoring and interviews, there appears to be compliance with the objectives of the required land and groundwater use restrictions.

Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of remedy selection still valid?

No. The ROD, which the Trustees have agreed to implement under the Consent Decree, confirms that "As remedial action progresses, these benchmark levels must be reviewed because the underlying standards and criteria change over time as scientific knowledge increases." The Acceptable Stream Concentrations used as acceptable levels for groundwater that may discharge to surface water are found in Attachment Z-1 to the Consent Decree and in the remedial design. Since the last five-year review was completed, EPA and IDEM reviewed the Acceptable Stream Concentrations for the site and found that levels identified in the Consent Decree have been revised. Some of the new levels may call into question the protectiveness of the remedy if the additional remedial action would allow these levels to be exceeded in discharges to Unnamed Ditch. EPA and IDEM proposed revised levels in a letter dated March 10, 2010 (see attachment) to the Trustees representing the PRPs for the site. In response the Trustees invoked dispute resolution procedures under the Consent Decree. EPA and IDEM agreed not to pursue changes to the levels at that time; however, if any remedial action activities would allow for the potential discharge of contaminants that exceed these levels, the Trustees would need to agree to adopt the more protective levels as required by the ROD.

With the exception of the Acceptable Stream Concentrations issue discussed above, federal and state standards for surface water quality and protection of aquatic life have not changed since the time of the ROD, as amended. Toxicity and other factors for some contaminants of concern have not changed significantly except for 1,1-dichloroethane as discussed previously in this report under the section entitled, "Remedy Implementation." For more information see the Agency for Toxic Substances and Disease Registry's toxicological profile for DCA available online at http://www.atsdr.cdc.gov/toxprofiles/tp133.html. Changes in risk assessment methodologies since the time of the ROD do not significantly impact the protectiveness of the remedy. Federal Applicable or Relevant and Appropriate Requirements ("ARARs") of the ROD consist of the Clean Water Act, the Clean Air Act, National Ambient Air Quality Standard, and OSHA and DOT standards. State ARARs include the groundwater standards and other appropriate sections of Part 201 and Part 31 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended. With the exception of arsenic, neither Federal MCLs nor State groundwater standards have changed significantly since the time of the ROD, as amended. There are no known newly promulgated standards applicable to the site. There is no known use of TBCs to establish cleanup levels at the site.

Land use or expected land use on or near the site has not changed. There has been no new identification of or changes to human health or ecological routes of exposure or receptors that may affect the protectiveness of the remedy. There are no known newly identified contaminants or contaminant sources. Unanticipated toxic byproducts of the remedy, not previously addressed by the decision documents, have not been identified. Physical site conditions or the understanding of these conditions have not changed in a way that could affect the protectiveness of the remedy. Toxicity factors for contaminants of concern at the site have not changed in a way that could affect the protectiveness of the remedy.

Other contaminant characteristics have not changed in a way that could affect the protectiveness of the remedy. The remedy is not expected to progress toward meeting the final Remedial Action Objectives until the operation of an effective remedial action. Finally, no Site uses which are inconsistent with the implemented ICs or the remedy IC objectives have been noted during the Site inspection or via interviews. Long-term protectiveness requires compliance with effective ICs.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy

Yes. Since the last five-year review was completed, data have been collected and evaluated indicating that the till unit that has been relied upon as a barrier to prevent downward migration may not be able to prevent all migration of shallow contamination to the deeper groundwater, in the long term. Contaminants may be migrating away from source areas. As of the date of this review, new ecological or human health risks have not been identified. There have been no known impacts from natural disasters.

Technical Assessment Summary

ICs are in place that prohibit interference with the remedy and use of the site including the use of groundwater. Based on inspections, monitoring and interviews, there appears to be compliance with the land and groundwater use restrictions. The property is currently zoned for commercial/ industrial use. Future industrial uses on adjacent parcels are not anticipated to significantly impact the site. Public water supply is available in the area. Significant future groundwater demand is expected to be met through deep wells because of the limitations of the shallower till unit underlying the area. The confining unit that has been relied upon in the past may not prevent the migration of shallow contamination to the deeper groundwater. As discussed in the previous five-year reviews, significant groundwater contamination was documented within the upper till unit with only minor contamination of a few wells screened in the underlying shallow sand and gravel unit. Contamination of the shallow sand and gravel deposit may have occurred via migration through the silty clay till on-site and/or through contaminated water and sediment in the former cooling water pond. The cooling pond had intersected the sand and gravel deposit before removal of contaminated water and sludge and backfilling with clean soil during removal actions in 1985.

Completed construction of the upper till unit TBCW and enhanced SVE system was documented in the 2009 Preliminary Close-Out Report. The enhanced SVE system was operated sporadically from 2008 until 2012. In spite of various modifications, the system has failed to meet cleanup standards.

Recent data indicate that the TBCW and trench system may not be containing the migration of site-related contaminants.

Recent groundwater monitoring reports for the Site and Third Site indicate the migration of onsite contaminants to the deep aquifer because the previously identified upward vertical hydraulic gradient is not present across the site and the ability of the underlying soils to act as a confining layer is questionable. Hydraulic conductivities in the shallow till zone were measured from 10-4 to 10-5 cm/sec, too high to be a competent confining unit. In addition, the upper till unit is discontinuous across the site and pinches out to the south and east. High precipitation events appear to control the shallow flow system across this site. As a result, apparent upward gradients may dominate a specific location at one point in time and reverse to downward gradients as recharge dissipates

Dense non-aqueous phase liquid ("DNAPL") was only identified historically at the Site in till well T-2, however, given the passage of time further investigation is appropriate. When present in significant quantity, DNAPL may act as a continuing source of groundwater contamination. Therefore, DNAPL is considered to be a principal threat waste.

Additional remedial action contemplated in the Consent Decree is necessary to ensure long term protectiveness. The Trustees who represent the PRPs for the Site have submitted the Flow Evaluation Work Plan for EPA review. The Flow Evaluation Work Plan proposes additional investigation and evaluations to support the selection of and design of an effective remedial action. The main outstanding issue and recommendation from the previous five-year review is remedy failure, and the design and implementation of an effective remedial action.

VIII. Issues

Table 5: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Remedy failed to meet performance standards and potential failure to provide containment	N	Y

IX. Recommendations and Follow-up Actions

Table 6: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Remedy failed to meet performance standards and potential failure to provide containment	Complete additional investigation and evaluations; select additional remedial measures. These additional remedial measures may require another ESD or ROD Amendment. Complete construction, and operate and monitor remedy. Review ICs once final remedy elements are established.	PRP, EPA	EPA, State	4/04/2015	N	Y

EPA also noted site maintenance issues that do not affect protectiveness but which should be addressed:

- Address fencing issues (woody vegetation growing through fence, holes, soil piled against fence, soil eroded away leaving holes under fence).
- Replace missing perimeter warning signs.
- Remove sediment and vegetative growth accumulation in the drainage ditches.
- Repair channeling and erosion in the last section of the drainage ditch leading to Unnamed Ditch.
- Clean out culvert in the north perimeter drainage ditch which was half full of weeds and sediment.
- Culvert along the east side of the site extends from the adjacent property under a road then under the Site fence and discharges as run-on into the east drainage ditch. Stormwater that comes from the working face of the adjacent property recycling operation would discharge into the Site stormwater drainage system. Divert water away from the site stormwater drainage system.
- Remove cat tail rushes from the decontamination pad.

- Properly dispose of a sealed 55-gallon drum that was stored on the decontamination pad.
- Label the treatment system components and sampling ports as required.

X. Protectiveness Statement(s)

The remedy is expected to be protective of human health and the environment upon completion of an effective remedial action and in the short term, exposure pathways that could result in unacceptable risks are being controlled. Institutional controls (ICs) are in place and effective. In order for the remedy to be protective in the long-term, additional remedial action is necessary. The Trustees who represent the PRPs for the site are planning additional investigation and evaluations to identify and design additional remedial action alternatives. These additional remedial measures may require another ESD or a ROD Amendment.

XI. Next Review

The next five-year review for the Site is required five years from the date of this review.

Attachments

List of Documents Reviewed
Site Maps

List of Documents Reviewed

1)-Final Remedial Investigation Report, Volumes 1 & 2, ECC Site, Zionsville Site (CH2M Hill, Mar 1986)
2)-Superfund Record of Decision: Northside Sanitary Landfill/Environmental Conservation and Chemical, IN (U.S. EPA, Sep 1987)
3)-Superfund Record of Decision: Enviro-Chem, Northside Sanitary Landfill, Amendment, IN (U.S. EPA, Jun 1991)
4)-Consent Decree, Civil Action No. 83-1419 C (United States District Court for the Southern District of Indiana, Sep 1991)
5)-Amendment to Consent Decree, Cause No. IP83-1419-C-M/S (United States District Court for the Southern District of Indiana, May, 1998)
6)-Explanation of Significant Differences, Enviro-Chem Site, Zionsville, Indiana (U.S. EPA, Sep 2006)
7)-Augmented SVE Trench Completion Report for Attachment Z-1 Remedy, Enviro-Chem Superfund Site (HIS Constructors, LLC, April 2009)
8)-Final Report, December 2009 Semi-Annual Surface and Subsurface Water Monitoring Report, Enviro-Chem Superfund Site, Zionsville, Indiana (August Mack, Feb 2010)
9)-Monthly Discharge Report, June 2011, Enviro-Chem Zionsville, Indiana, (IWM consulting Group, July 26, 2011)
10)-Monthly Discharge Report, August, 2011 2011, Enviro-Chem Zionsville, Indiana, (IWM consulting Group, July 26, 2011)
11)-Monthly Progress Report- July 2011, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ September, 2011)
12)-ASVE Trench System Sampling, ECC Site, November 4, 2011, (Environ, January, 2011)
13)-December 2010 Surface and Subsurface Water Sampling Event, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, March 2011)
14)-Monthly Discharge Report, April, 2012, Enviro-Chem Zionsville, Indiana, (IWM consulting Group, April 26, 2012)
15)-Flow Evaluation Work Plan, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, Jun 2012)
16)-June 2012 Surface and Subsurface Water Sampling Event, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, August 2012)
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18)-Bench-Scale Treatability Report in Support of a ZVI Application in a Reactive Vessel for Treatment of cVOCs at a Site in Zionsville, IN (FMC Adventus, April 2012)
19)-May 20, 2011 TECHNICAL MEMORANDUM, Proposed PRGS Enhancements
20)-ECC Site Trench Water Dissolved Oxygen Measurements (Environ September 26, 2012)
21)-ECC Site Water Treatment System Capacity Evaluation (Environ September 27, 2012)
22)-Analytical Results for Subsurface Water Samples - December 2012 (Table by Environ, February 13, 2013)
23)-December 2012 Surface and Subsurface Water Sampling Event, Enviro-Chem Superfund Site, Zionsville, Indiana (Environ, March 2013)

Site Location

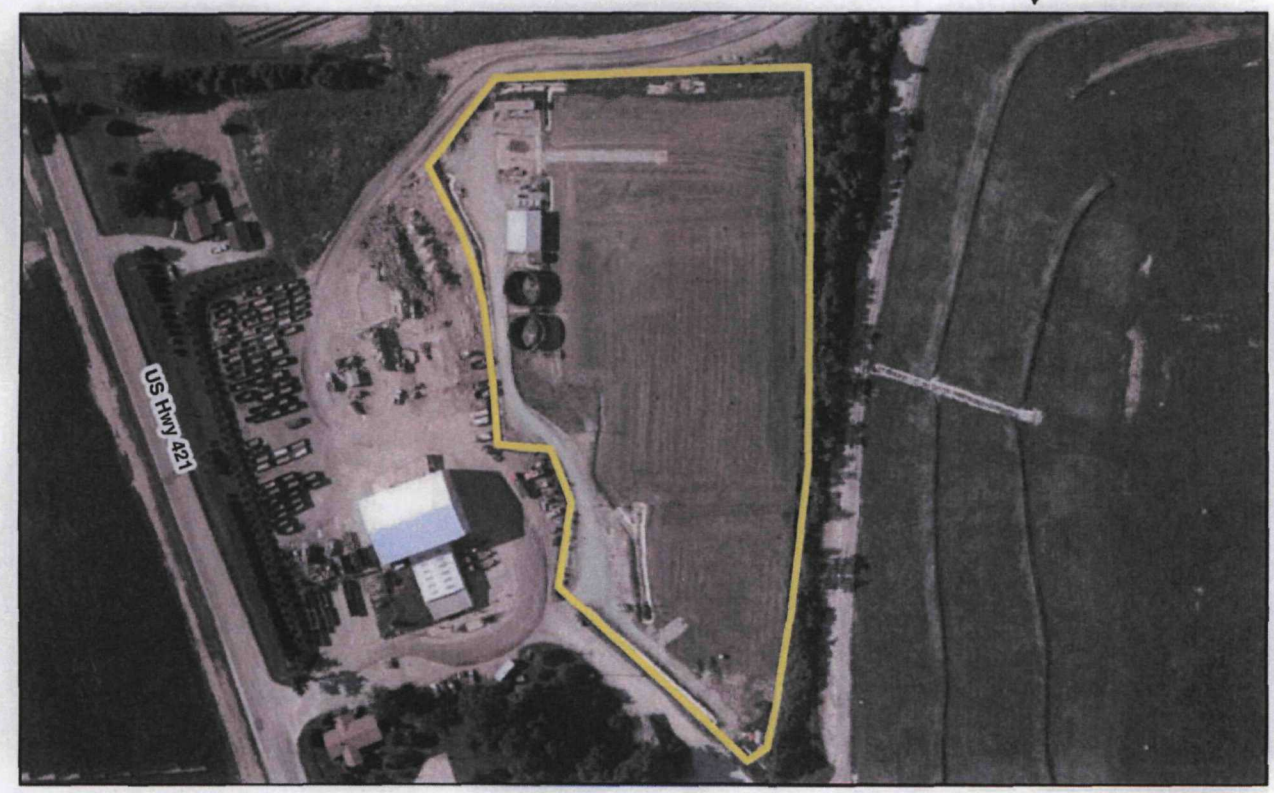
Superfund
U.S. Environmental Protection Agency

EnviroChem Corporation
Boone County, IN

IND084259951

State

County



Site

Legend

EnviroChem Corp. Site

N

Produced by Julie Schilf
U.S. EPA Region 5 on 4/3/08
Image Date: 2005

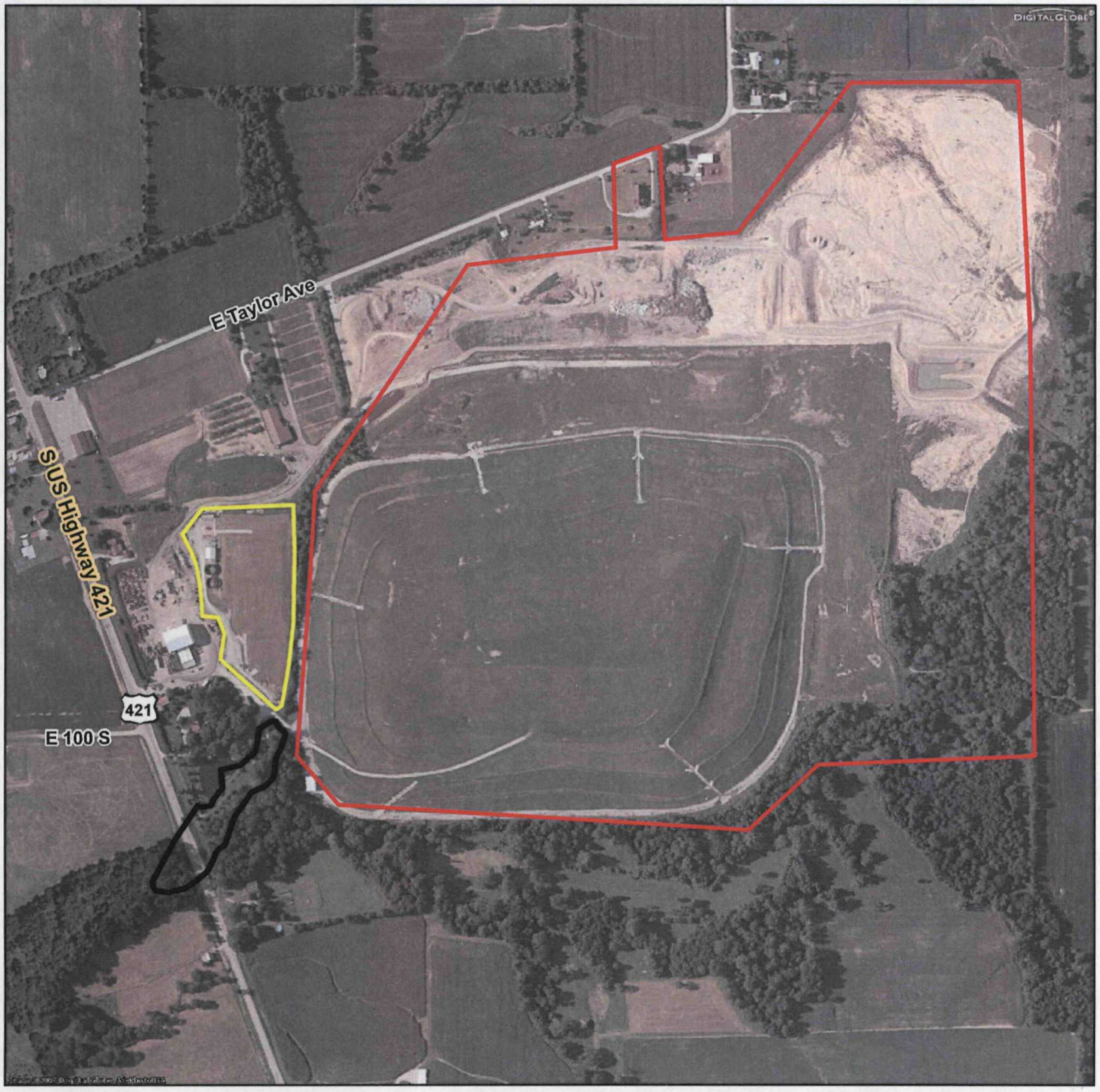
GEOS
Groundwater Evaluation and Optimization System

Area Properties

Superfund
U.S. Environmental Protection Agency

EnviroChem Corporation
Boone County, IN

IND084259951



0.25 Miles

Legend

- Northside Sanitary Landfill
- Third Site Boundary
- EnviroChem Corp.

N

Produced by Julie Schilf
U.S. EPA Region 5 on 4/3/08
Image Date: 2005

GEOS
Groundwater Evaluation and Optimization System